$$= \frac{4r(a+b)n\ \sin\frac{\pi}{2n}-r^2(2\pi+2n\ \sin\frac{\pi}{n}}{\pi ab}.$$

If $n=2$, $p=\dfrac{4r(a+b)\sqrt{2}-r^2(2\pi+4)}{\pi ab}$.

Let $l=4rn\ \sin\dfrac{\pi}{2n}$ be the perimeter of the polygon.

Then $p=-\dfrac{(a+b)l-2\pi r^2-rl\ \cos\frac{\pi}{2n}}{\pi ab}$.

Let b be infinite.

Then $p=\dfrac{l}{\pi a}=\dfrac{l}{l'}$, where l' is the perimeter of the circle having a for its diameter.

Excellent solutions were received from *Professors Matz and Draughon.* Their solutions may appear in January Number.

PROBLEMS.

22. Proposed by ALTON L. SMITH, Instructor in Drawing, Polytechnic Institute, Worcester, Mass.

In a series of counts of the votes on a legislative act relative to the city of Worcester, the followidg results were obtained:

	YES.	NO.
1st count	5566	5511
2nd "	5519	5558
3d "	5546	5517
4th "	5512	5551
5th "	5512	5541

What is the probability that the last count (5th) is correct?

23. Proposed by F. P. MATZ, M. Sc., Ph. D., Professor of Mathematics and Astronomy in New Windsor College, New Windsor, Maryland.

Find the average area of all the triangles that can be drawn *perpendicular-sided* to a given plane scalene triangle.

EDITORIALS.

An exhaustive solution to problem 33, Arithmetic Department, was received from A. H. Bell, but too late for credit in the proper place.

D. G. DURRANCE should have been credited with solving problem 32, Arithmetic Department.

WE can furnish a limited number of complete sets of Vol. I, for $2.00.

SEND all subscriptions by Money Order, or Draft, made payable to B. F. FINKEL.

DR. F. P. MATZ says: "Raise the subscription price of the MONTHLY —no *sane* person can see nor understand how you can give so much mathematics per year at $2.00. Raise the subscription if you intend to keep the MONTHLY a monthly publication."

WE now ask our contributors to exercise the greatest care in preparing papers, problems, and solutions. Write and punctuate your contributions as you would wish to have them appear in print. This will be a great help to the editors and a source of pleasure to the readers.

PROFESSOR E. P. THOMPSON, of Miami University, Oxford, Ohio, says: "I am getting several mathematical periodicals, some foreign, and yours appears to fill a field that needs occupying . . . . I think your idea of monthly biographies an excellent one. Also by representing each branch of Elementary Mathematics by sets of problems and answers."

WE have contracted with our publishers to have the MONTHLY mailed to our subscribers between the 20th and 25th of each month, thus avoiding the irregularity that prevailed during the past year. This No. was mailed Jan. 23. The delay was unavoidable. We hope to get Jan. No. out in a few weeks and then have subsequent Nos. to appear within the terms of our contract.

One of the Editors of the Cosmopolitan Magazine is Arthur Sherburne Hardy, Ph D., Professor of Mathematics in Darthmouth College and author of a text-book on Analytical Geometry, on Calculus, and on Quaternions. By special arrangements with the managers of the Cosmopolitan, we are enabled to offer a liberal commission to agents to canvass for that popular Magazine and the MONTHLY. Write to us at Kidder, Mo., for terms.

THERE are numerous typographical errors in the current volume. These are as annoying to the editors as to our readers. But when it is remembered that the JOURNAL is made up and proof read after hearing eight recitations per day it is not surprising that such errors should occur. Besides, unfortunately many parts of pages are printed without being proof-read at all, and the greater part of the JOURNAL is printed after one proof-reading. But errors of this nature we hope to reduce to a minimum, as we have determined to give every page a second proof-reading.

THIS number completes Volume I. of the AMERICAN MATHEMATICAL MONTHLY. It is not for us to praise the merits of our own Journal, though there are a few things we may say without violating any rules of propriety. The JOURNAL was started as an experiment. Had we consulted our financial intrests only not a line would have been printed for we expected to lose some money. This expectation was based upon our own calculations and the experience of other pioneers in Mathematical Journalism. Our expectation in this respect has been fully realized, notwithstanding, that some of our warm friends not only trebled and quadrupled their subscriptions, but also paid for diagrams,

plates, and papers. But while we have realized a financial loss, our subscription list has come up to our estimation. More than this, we have the hearty co-operation of the best Mathematicans in America, which also will insure success to any magazine. These ardent workers are not only contributing articles to the MONTHLY which will be incorporated in the future literature of Mathematics, but are also putting forth a strong effort to extend the circulation of the MONTHLY. By these efforts the MONTHLY is gaining a high place among the magazines of the world. In view of these encouragements we have made arrangements to continue the publication of the MONTHLY. at least, another year, and we invite all of our present subscribers to continue with us and also to secure one or two new subscribers. By proper co-operation the enterprise can be made very successful. There is no reason why every Professor and Teacher of Mathematics in the United States should not become a subscriber. The JOURNAL is open to the publication of articles in every department of mathematics. Subscribers should not complain if each issue is not devoted entirely to the particular matter in which they are interested. Vol. 1. contains 444 pages and as this large volume only costs $2 no one should complain because it does not contain more.

A FEW weeks ago we purchased a set (4 Vols.) of the AMERICAN ENCY-CLOPÆDIC DICTIONARY. This marvelous work, which was completed in Nov. 1894, contains 4,730 large folio pages. It is bound in substantial cloth and printed on good paper (the same as used in Webster's International) and in clear type. Thousands of copies of this work were sold through the coupon system by a paper in Chicago, the cost of the Dictionary thus being $7.35 unbound, or $10.55 bound in cloth. We shall take pleasure in sending this Dictionary bound in 4 volumes (cloth) to any of our readers on receipt of $6.75; leather binding $8.75. The Dictionary is no reprint, but entirly new and is worth, at least, $40.00. Send in your order at once and secure a dictionary which is only surpassed (if surpassed at all) by the Century Dictionary.

The American Mathematical Monthly in the Fortschritte der Mathematik:

An extract from a letter to Dr. George Bruce Halsted from Dr. Paul Staeckel of the University of Halle may be thus translated:

"HONORED SIR: At the meeting of scientists in Vienna, I met Professor Vasiliev of Kasan, who informed me that you would translate his Address at the Lobachevsky-commemoration. This news was very welcome to me, since I cannot understand Russian.

And now to-day I have received this translation of yours, and desire to express my profoundest thanks.

You have, by the translation of this most interesting address established a claim to the thanks of the whole mathematical world!

I am much obliged to you for the AMERICAN MATHEMATICAL MONTHLY, which I follow with interest. I will give an account of it in the next volumne of the *Fortschritte der Mathematik.*"

THE MONTHLY will be continued as such the coming year and the price will not be increased. Vol. II. will contain about 400 pages. A number of

interesting papers will appear during the year. Trusting that the aid and sympathy of our friends may be relied upon for the new year and thanking you for past favors, we conclude the Old and begin the New.

BOOKS.

Exercices D'Arithmetique. Enonces et Solutions. Par J. Fitz-Patrick, Ancien Professeur de Mathematiques et Georges Chevrel, Directeur de L' Institution Charlemagne, a Tours. With a preface by M. Jules Tannery, Assistant Instructor at the High Normal School. Large 8vo, paper cover, 484 pages, Price, 10 francs. Paris: A. Hermann.

It is believed that there has never before been a work written of the nature of the one under consideration. The publisher in a letter to us says that he thinks there has never before been a work of this nature published either in Europe or America. The table of contents is as follows: Preface; Chapter I., Preliminary Definitions.—Numeration: Chapter II., Addition and Subtraction; Chapter III., Multiplication; Chapter IV., Division; Chapter V., Divisibility of Numbers: Chapter VI., Common Divisor of Whole Numbers: Chapter VII., Prime Numbers: Chapter VIII., Fractions: Chapter IX., Decimal Fractions and Decimal Numbers; Chapter X., Ratios and Proportions; Chapter XI., Different Systems of Numeration; Chapter XII., Squares and Square Roots; Chapter XIII., Cubes and Cube Roots; Chapter XIV., Progression; Chapter XV., Miscellaneous Questions; Chapter XVI., Elementary Notions on the Theory of Numbers; Note by M. Matrot.

Each problem is completely solved.

To give our readers a better idea of the nature of this interesting work, we will translate a few of the questions.

Question 1.—*To investigate the change a number experiences, when we write one or more zeros between its digits.*

The authors first consider the case where one zero is written between the digits and take as an example, the number 6237. For this they write 62037, and show that $62037 = 9 \times 6200 + 6237$. Next they take 6204 and for it, write 620004. This is equal to $99 \times 6200 + 6204$. They next take the case where zeros are written between several digits of a number. As an example, they take 36356 for which 306300506 is substituted. This is shown to be equal to $9 \times 36350 + 99 \times 363000 + 9 \times 30000000$.

Question 285.—*A number divisible by 4 is always the difference of the squares of two whole numbers.*

Represent by $4N$ any multiple whatever of 4.

We have $4N = 2N + 2N = 2N + N^2 + 1 - N^2 - 1 + 2N$
$$= 2N + N^2 + 1 - (N^2 - 2N + 1)$$
$$= (N+1)^2 - (N-1)^2.$$

Question 403.—*Demonstrate that if $\varphi(n)$ is a multiple of $(n-1)$, the number n is prime.*

Question 421.—*If a and b are two prime numbers, the expression $a^{b-1} + b^{a-1} - 1$ is divisible by ab.*